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ABSTRACT

In order to determine rural land use in the Monongahela River Basin, 11,528 landowners, controlling 40 percent of 10 contiguous counties in north-central West Virginia and constituting 19 percent of the rural population, were surveyed. Data derived from 892 questionnaire responses were analyzed in terms of past, present, and future land use; land valuation; market trends; tenure; and prospects for potential conflicts among competing rural land uses. Specifically, data encompassed: (1) population statistics, 1950, 1960, 1970; (2) export industries; (3) rural land use in 1972 (acreage distribution, land values, mineral resources, idle farmland, farm income, agricultural crops, crop acreages, livestock income); (4) changes in land use, 1962-72; (5) anticipated land use changes, 1982; (6) land use problems (farm operation, water sources, and disturbed lands). Results indicated rural landowners: (1) owned less than 100 acres; (2) large tracts were few, averaging 177.9 acres; (3) beef cattle sales comprised the major source of farm income, but most owners earned greater incomes off the farm; (4) large owners of timber and mineral rights were notably absent from the survey population; (5) 50 percent of those surveyed had coal reserves, 80 percent had coal rights, and 13 percent indicated willingness to sell; (6) farmland will decrease and farms will increase in size; (7) livestock production will be the major determinant of the surveyed land. (JC)

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Rural Land Use in the Monongahela River Basin

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Land use information is needed for research being conducted by the West Virginia University Agricultural Experiment Station, and for the river basin planning activities of the U. S. Department of Agriculture (USDA). NRED provides economic research to the river basin planning agencies of USDA. These agencies (NRED, Forest Service, Soil Conservation Service) are engaged in the Monongahela Basin Study, under leadership from the West Virginia Department of Natural Resources. Data from this research are important elements of water and related land planning activities in this basin.

THE AUTHORS

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Rural Land Use in the Monongahela River Basin

Jacob Akintola, Dale Colyer, and Wayne Weber

Division of Resource Management
Agricultural Experiment Station
College of Agriculture and Forestry, West Virginia University
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U. S. Department of Agriculture
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ABSTRACT

Uses of rural lands in 10 contiguous north-central West Virginia counties were studied from responses made by a sampled population of 11,528 rural landowners who controlled 47 per cent of the land area and accounted for 19 per cent of the rural population. The 10-county area closely approximates the natural drainage area of the Monongahela River and is a delimited economic region. Natural resource related industries, particularly bituminous coal, are export industries with an average employment multiplier effect estimated at four times the change in basic industries.

Rural landowners typically owned less than 100 acres. Large tracts were few, but the average parcel size was 177.9 acres. Beef cattle sales comprised the major source of farm income, but most owners reported greater incomes earned off-farm. Large owners of tracts of timber and mineral resources and rights were notably absent from the population. However, one-half of those sampled indicated coal reserves on land, and 80 per cent owned the coal rights. Only 13 per cent indicated a willingness to sell the rights.

Trends of decreased farms and farmland acreage will continue and be partially offset by increased farm size. An anticipated rise of beef cattle numbers may increase the need for hay and pasture land. Generally, livestock production will be the major determinant of the surveyed rural land. The major obstacle to increased production was the lack of "good land" for expansion. Water for rural domestic and agricultural uses was satisfactory for more than 90 per cent of the respondents.

KEY WORDS: West Virginia, north-central, Monongahela River, drainage area, rural land–landowners, economic region, natural resources, coal, export–basic industries, employment multiplier, parcel size, off-farm income, beef cattle, coal rights, decreased farms–acreage, land use determinent, "good land," rural domestic and agricultural water.

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Rural Land Use in the Monongahela River Basin

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West Virginia ranked second among the states in the proportion of the population living in rural areas in 1970. With 61 per cent living outside towns of 2,500 or more, the uses made of rural lands can have a significant impact on the well-being of the state's residents. Anticipated population growth and higher discretionary income levels indicate that the demand for land in the state will continue to grow and that there will be intensified competition for alternative land uses. For example, mineral, timber, and food production compete with living and recreational space uses and all are expected to increase in importance. The purpose of this bulletin is to provide background material based on a study of the Monongahela River Basin for insights into rural land issues, concepts, and problems. These include past, present, and future land utilization, land valuation, market trends, tenure, and prospects for potential conflicts among competing rural land uses.

THE STUDY AREA

Rural lands studied were located in 10 contiguous counties of north-central West Virginia, an area of approximately 4,491 square miles which will be referred to as the Monongahela River Basin or "the basin" (Figure 1). These 10 counties basically form the natural drainage area for the river. In addition, the Bureau of Economic Analysis, U. S. Department of Commerce, designated the region as an economic area as a result of analyses of journey-to-work data reported in the 1960 Census of Population.[1] The trade centers of Morgantown, Fairmont, and Clarksburg influence the configuration of the economic area and account for a substantial portion of the area population (Table 1).[2]

[1]U. S. Water Resources Council, *Obers Projections, Regional Economic Activity in the U. S.*, Volume 1, U. S. Gov. Printing Office, Washington, September 1972, p. 25.

[2]*Transportation and Trade Areas: An Analysis of Morgantown, Fairmont and Clarksburg*, Research Series II, Office of Research and Development, Appalachian Center, West Virginia University, March 1968

The basin, rich in deposits of bituminous coal, was drawn into the industrial era about the turn of the century by technological advances in iron and steel production centered at Pittsburgh. Prior to this time, most people and their commerce were directly related to agricultural and forestry pursuits as they had been since settlement of the area. However, with the burgeoning industrial age, the basin economy became dichotomous, with exchange also being earned from extractive industries. Most natural resource exports continue to be shipped from the area as raw materials, with relatively little value added from processing or manufacturing done within the basin.

The natural resource related industries, however, remain the more important ones in the basin. As major export industries, they are prime movers of the economy since they provide income earned out of the basin which is necessary to support resident industries, particularly services. (Export activities of the basin are listed in Table 2.) The importance of basin export industries extends

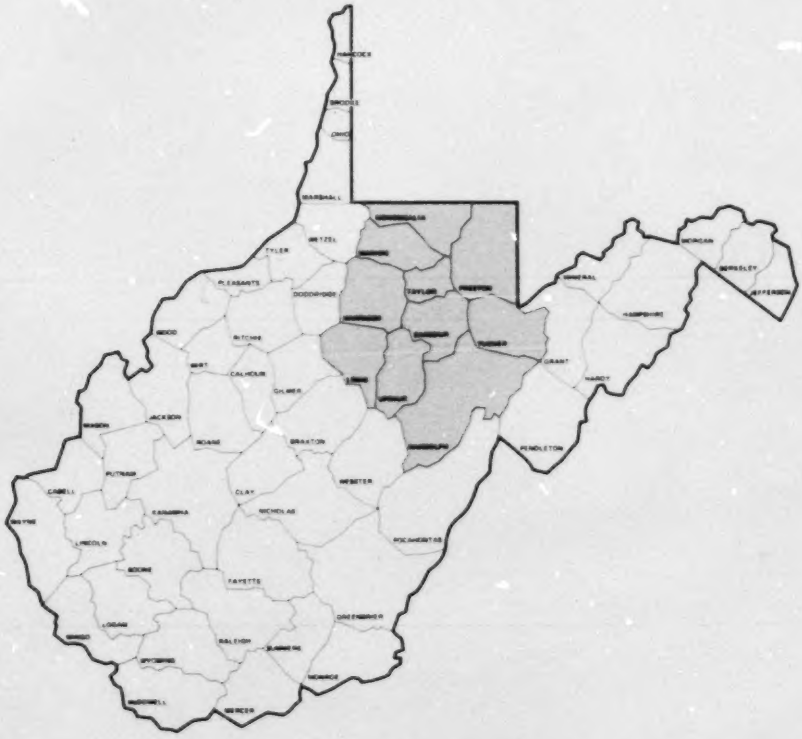

FIGURE 1. Monongahela River Basin in West Virginia.

TABLE 1. Population in the Monongahela River Basin by Counties, 1950-1970

County	1950	1960	1970
Barbour	19,745	15,474	14,030
Harrison	85,296	77,856	73,028
Lewis	21,074	19,711	17,847
Marion	71,521	63,717	61,356
Monongalia	60,797	55,617	63,714
Preston	31,399	27,233	25,455
Randolph	30,558	26,349	24,596
Taylor	18,422	15,010	13,878
Tucker	10,000	7,750	7,447
Upshur	19,242	18,292	19,092
Totals	368,654	327,009	320,443

Source: U. S. Census of Population

TABLE 2. Export Industries in the Monongahela River Basin Ranked by Order of Importance

Rank	Export Activity*
1.	Mining
2.	Other durable goods
3.	Electrical machinery
4.	Railroads and railway express, utilities and sanitary services
5.	Education, government
6.	Education, private
7.	Furniture, lumber, and wood industries
8.	Machinery, except electrical
9.	Printing and publishing
10.	Hospitals

*An export activity is assumed to exist if the proportion of employment in this basin industry was greater than the state or nation.

beyond the direct employment effects in those industries, since changes in the basic industries have a multiplier effect throughout the economy. The effect on total employment has been approximated at four times the change in basic employment.[3] In other words, for every additional job in the basic industries, four additional jobs are created in non-export or service industries. A loss in employment in the basic industries would similarly decrease total employment.

Bituminous coal is the most important mineral resource in the basin and is the largest source of exports, with the greatest income and employment generating effects. Coal production, and especially surface mining, is also the most physically intensive use of rural lands and has a great adverse interaction with competing land uses. Some form of mining activity (deep, surface, or auger mining) has been reported in all basin counties for many years. These coal reserves are in both the northern West Virginia and, more extensive, Appalachian bituminous coal fields.

METHODOLOGY AND PROCEDURES

Primary data for this study were obtained from rural landowners who responded to a confidential mail questionnaire. The sample was randomly selected from a finite population of 11,528 landowners registered for rural land assistance programs administered by the Agricultural Stabilization and Conservation Service (ASCS). Permission was obtained from the appropriate ASCS offices to use the county mailing lists from which the names and addresses were selected.

Prior to the first full mailing, a small sample pre-test was conducted. Twenty per cent, or five of the 25 questionnaires were returned. The survey forms consequently were modified slightly after the pre-test to improve the quality and frequency of responses. To achieve the desired sample reliability, a minimum of 834 returned questionnaires was necessary. Accordingly, 4,125 names were selected and the questionnaires along with a letter of explanation and prepaid return envelope were mailed. A total of 892 fully or partially completed questionnaires were returned, 693 from the initial mailing and 199 in response to a letter of reminder.

The 11,528 landowners were about six per cent of the total rural population in the basin and if their households were of average size, 3.03 persons, they represented approximately 19 per cent of the rural population in the basin. However, this relatively small proportion of the population reported control of 1,344,591 acres, or 47 per cent of the land in the study area. Since the landowners were ASCP participants, many small-sized parcels used strictly as

[3]*Economic Base Study of the Monongahela River*, Vol. 2, Part B, W. Va. Dept. of Natural Resources, Charleston, 1974, p. 31.

rural residences would not have been included in the sample.[4] In addition, a few large tracts and/or corporate holdings were not included in either the population or sample. Many valuable mineral and timber lands are held in large units by incorporated owners, many of whom do not participate in the ASCP programs. The analysis of rural land uses can be expected, therefore, to be somewhat incomplete with respect to total acreage of rural land in the Monongahela River Basin.

RURAL LAND USE IN 1972

The 892 questionnaires which were returned were used to obtain data on land use and related information.[5] The only personal data requested was the age of the landowner. The average age of the respondents was 55 years–but the range was from 15 to 93 years. Nearly half of the owners were between 50 and 70 while less than a fifth were under 40 years of age (Table 3).

TABLE 3. Age Distribution of Surveyed Landowners in the Monongahela River Basin, 1972

Age	Frequency	Percentage
0 and – 19.9	32	3.624
20 and – 29.9	33	3.737
30 and – 39.9	90	10.193
40 and – 49.9	173	19.592
50 and – 59.9	213	24.122
60 and – 69.9	204	23.103
70 and – 79.9	104	11.672
80 and – 89.9	29	3.284
90 and Over	5	0.566
Total	883	100.000

[4]A possible weakness of the data may arise from use of this population and sample composed of active or recent cooperators in land-based production programs. Rural land uses represented by the data may therefore be biased towards production.

[5]One striking result observed during the processing of returned questionnaires was the variability in total number of questions answered. As a minimum, the direct informational questions comprising about the first one-half of the questionnaires were expected to be answered by a high proportion of sampled persons, but this did not occur. Accordingly, statistical tests were used to determine whether such common variables as age of the respondents, size of landholdings, or land values had any bearing upon the number of questions answered. The results indicate that age appeared to be the only variable that might have had any significant effect upon the number of questions completed. Specifically, those from 30 to 49.9 years of age answered more questions than did those in other age classifications. Generally, the test results supported that there were not serious biases due to the incompleteness of returned questionnaires.

Acreages Owned

The average size of parcel owned by the respondents was 177.9 acres, with a range of between 0.3 and 7,895 acres. A division of acreages owned into 50-acre units showed the greatest concentration of owners among those people possessing less than 100 acres (Table 4). The group with less than 50 acres contained 27.86 per cent of the number of owners, while the group with between 50 and 100 acres accounted for 23.78 per cent of the owners. The two groups of between 100 and 150 acres and 150 and 200 acres accounted for 13.59 per cent and 14.04 per cent, respectively, and each of the remaining groups accounted for less than 10 per cent of the number of owners.

TABLE 4. Distribution of Acreages Owned by Respondents in the Monongahela River Basin, 1972

Acres	Frequency	Percentage
0- 49.9	246	27.86
0- 9.9	8	0.91
10-19.9	78	8.83
20-29.9	60	6.79
30-39.9	51	5.78
40-49.9	49	5.55
50- 99.9	210	23.78
50-59.9	44	4.98
60-69.9	67	7.59
70-79.9	31	3.51
80-89.9	34	3.85
90-99.9	34	3.85
100-149.9	120	13.59
150-199.9	124	14.04
200-249.9	65	7.36
250-299.9	21	2.38
300-349.9	24	2.72
350-399.9	11	1.25
400 and above	62	7.02
Total	883	100.00

Values of Land Owned

The average value of land (including all land, buildings, coal, oil and gas), as estimated by the respondents, was $46,964.47 per rural land owner in the 10 counties. The estimated values ranged from $50 to $1,000,000 and the average per acre value was $250. However, only 662 or 78 per cent of the respondents answered this question. Some of the landowners who did not answer the question indicated an unwillingness to do so because of personal reasons–generally tax related.

The distribution of values showed a substantial number of low valued properties and relatively few high valued, which caused the average to be high (Table 5). There were 26.39 per cent of the rural landowners who reported the value of their land as being less than $250 per parcel. These values, however, do not tend to be consistent with the acreages owned since less than one per cent of the respondents owned under 10 acres.

Nearly 14 per cent and 15 per cent of owners reported total land values as being between $10,000 to $19,999 and $20,000 to $29,999, respectively. These percentages and values are consistent with the reported acreages for the same parcels. Another 13.48 per cent of the respondents reported values between $50,000 and $100,000. Only seven per cent of the owned land was reported to be worth more than $100,000.

TABLE 5. Distribution of Reported Values of Land Owned by Survey Respondents in the Monongahela River Basin

Land Value Ranges (Dollars)	Frequency	Percentage
Less than 250	233	26.39
250-4,999.9	36	4.08
5,000-9,999.9	40	4.53
10,000-19,999.9	123	13.93
20,000-29,999.9	131	14.83
30,000-39,999.9	72	8.15
40,000-49,999.9	67	7.59
50,000-99,999.9	119	13.48
100,000 and above	62	7.02
Total	883	100.00

Mineral Resources

Mineral resources such as coal, oil, and gas are important factors affecting land use in the Monongahela River Basin. To determine the importance of these resources to rural landowners several questions were asked and are summarized in Table 6. The responses indicated that over half of the properties have coal reserves and that about 80 per cent of the owners of those lands also own the coal rights. Of those still owning the reserves, only 13 per cent indicated that they would be willing to sell the rights. About one-fourth of the landowners indicated that their lands were near coal tipples and a fourth were close to lands being strip mined. Many of those who indicated a willingness to sell their coal rights also said that strip mining was occurring nearby.

Approximately three-quarters of the owners said that their lands had oil and gas reserves and 61 per cent of them still owned the rights. Very few were willing to sell their oil and gas rights but they were not asked if they would lease them – the usual procedure for handling oil and gas rights.

Idle Farmland

Many of the rural landowners have not farmed their lands–for one reason or another–in the last 10 years. Over 400 respondents indicated that some of their land was not used for farming. Table 7 shows the major categories that add up to 42,596 acres of "idle" lands. Of this total 15,601 acres (or 36.6 per cent) were in woodland and 14,110 acres (or 33.1 per cent) were in pastureland. In other words, about 70 per cent of the entire idle land was in woodland and pastureland. Brush with 6,029 acres made up 14.15 per cent while cropland with 5,675.9 acres accounted for 13.32 per cent. The 1,180 acres of surface mined land comprised a small part (2.77 per cent) of the total.

TABLE 6. Responses of Survey Landowners to Questions Concerning Mineral Rights

Question	Response	
	Yes	No
	Per Cent	
Do your lands have coal reserves?	55.3	44.7
Do you own the coal rights?	44.8	55.2
Do you plan to sell these rights in the fugure?	12.1	87.1
Is your land near a coal tipple?	24.4	75.6
Are neighboring lands being stripped for coal?	25.2	74.8
Do your lands have oil and gas reserves?	72.8	27.6
Do you own these oil and gas rights?	61.1	32.9
Do you plan to sell these rights?	12.9	91.1

TABLE 7. Idle Farmland on Surveyed Properties in the Monongahela River Basin

Land Uses	Ownership Frequency	Acres	Percentage of Acres
Woodland	408	15,601	36.63
Pastureland	402	14,110	33.13
Cropland	280	5,675	13.32
Brush	244	6,029	14.15
Strip Mined Land	137	1,180	2.77
Total	—	42,596	100.00

Farmers and Farm Income

Of 705 rural landowners who responded to a question about farming, only 118, or 16.74 per cent, reported that they were full-time farmers. The average gross income (from all sources) for 522 landowners who responded to the questions was $11,249. The range of reported income was from $14 to $100,000. A more detailed distribution given in Table 8 shows that about one-fourth of the respondents were in each of the first three $5,000 categories.

TABLE 8. Distribution of Gross Incomes for Survey Respondents in the Monongahela River Basin

Income (Dollars)	Frequency	Per Cent
Less than 5,000	128	24.527
5,000 and less 10,000	146	27.969
10,000 and less 15,000	125	23.946
15,000 and less 20,000	58	11.111
20,000 and less 25,000	24	4.597
25,000 and less 30,000	12	2.298
30,000 and less 40,000	12	2.298
40,000 and less 50,000	6	1.149
50,000 and above	11	2.107
Total	522	100.000

Accordingly, 85.5 per cent of the landowners said they had a source of income larger than their farm income and only 14.5 per cent received a majority of their income from farm operation revenues.

About 70 per cent of the rural landowners who reported farm income indicated that they received less than $2,500 from farm sales (Table 9). Another 13.6 per cent received between $2,500 and $4,999 while seven per cent received between $5,000 and 9,999. Only 9.4 per cent received over $10,000. Nearly 63 per cent of the respondents indicated that farm sales had increased over the last five years. The most significant sources of farm income were livestock and livestock related sales (Table 10). The study showed that 55.5 per cent derived their farm income from beef cattle. Other income sources were from feeder cattle (9.5 per cent), hay (7.8 per cent), and milk (6.3 per cent).

Agricultural Crops

About half, 72,264 acres, of the land of the surveyed landowners was included in the acreages of those who reported land used for agricultural output in 1972. Much of the land in agricultural uses in 1972 was to support the forage consuming livestock which were the main sources of farm income (Table 11). However, timber and brush accounted for 37 per cent of the total land. Pasture was second in magnitude with over one-fourth of the acreage reported as being "cropland pastured." (A portion of the land may have been permanent pasture since respondents were not asked to indicate permanent pasture acreages.) In addition a substantial portion of the nearly 4,000 acres was not accounted for in the individual uses listed and may have been permanent pasture. Land used for hay accounted for about one-sixth of the land area and more owners reported having hay land than any other single use.

Corn was the most important crop grown, except for hay, but occupied less than three per cent of the total area for which agricultural uses were reported.

TABLE 9. Distribution of Value of Farm Sales by Surveyed Rural Landowners in the Monongahela River Basin

Value of Farm Sales (Dollars)	Frequency	Percentage
Under 2,500	385	69.87
2,500 to 4,999	75	13.61
5,000 to 9,999	39	7.08
10,000 or above	52	9.44
Total	551	100.00

Small grains for grain and small grains for hay and silage accounted for about two per cent of the area on the farms reporting while all the other uses were one per cent or less, except for idle land. Mobile home parks and strip mined lands also were uses which occupied relatively small acreages on the farms reporting agricultural uses. The distribution of acreages in specific uses are shown in Appendix A of this bulletin.

Livestock on Farms

Most of the farm income in the basin is derived from livestock, particularly forage consuming livestock, which also are important determinants of land use. The numbers of farms with various livestock classes are summarized in Table 12 and the frequencies distribution of the different classes are given in the Appendix.

Beef cattle were on more farms (410) than any other class of livestock. The average number was 32 per farm although over 70 per cent of the farms had 30 cows or less. Dairy cattle also were kept on a substantial number of farms (103), but over 70 per cent of these had 10 cows or less and many of these had only one or two, probably to supply milk for domestic use. There were 22 farms with more than 30 cows per farm and 15 of these had over 50 cows each. Horses were kept on 103 farms but there were only one or two horses each on over 50 per

TABLE 10. Sources of Farm Income for Surveyed Rural Landowners in the Monongahela River Basin

Farm Income–Sources	Frequency	Per Cent
Beef cattle	263	55.48
Feeder cattle	45	9.49
Hay	37	7.81
Milk	30	6.33
Cattle, sheep, horses, chickens, hogs	23	4.85
Sheep	20	4.22
Timber	16	3.38
Produce	16	3.38
Royalties	7	1.48
Minerals	5	1.05
Others	12	2.53
Total	474	100.00

cent. Most horses are used for recreational purposes. The other major class of forage consuming livestock, sheep and lambs, was reported on 69 farms but the average was only nine per farm. Relatively few farms and very few of commercial size kept any of the other classes of livestock or poultry.

TABLE 11. Crop Acreages on Survey Farms in the Monongahela River Basin

Land Uses	Number of Respondents	Total Acres	Average Acreage Per Farm
All other hay	368	12,619	34.29
Corn for grain and silage	128	2,045	15.98
Cropland pastured	239	18,275	71.47
Brush and timber not pastured	221	26,889	121.67
Truck crops or fruit trees	76	347	4.57
Oats, wheat, barley or rye for grain	50	666	13.32
Small grain for hay or silage	32	553	17.28
Farm ponds, streams, rivers, etc.	99	380	3.84
Christmas trees, ornamental evergreens, nursery products, flowers, etc.	48	464	9.67
Acres planted for wildlife	48	670	13.96
Acres timbered	112	316	56.39
Idle cropland	46	1,042	22.65
Soil bank land	33	126	3.82
Soybeans	7	181	24.86
Other idle land	42	1,035	24.64
Mobile home parks, housing units, or commercial development	20	112	5.60
Acres stripped for coal	25	544	21.76
Total farm acreage	—	66,264	—

LAND USE CHANGES AND PROJECTIONS

Both the changes in farmland use that owners had made during the last decade and those they expect to make during the next decade were determined. Although not all, nor the same, respondents answered both sets of questions, there were sufficient responses for the data to be useful. Since animal production is a major determinant of agricultural land use in the Monongahela River basin, past changes and expected production of the various livestock classes also were determined.

TABLE 12. Livestock on Survey Farms in the Monongahela River Basin 1972

Class of Livestock	Number of Farms Responding	Total Number of Livestock on Farm	Average Number Livestock Per Farm
Beef cattle and calves	410	13,163	31.71
Dairy cattle and calves	103	2,321	22.54
Hogs and pigs	71	691	9.34
Sheep and lambs	69	585	8.49
Horses and mules	103	289	2.81
Goats	16	110	6.87
Turkeys and chickens	119	6,679	56.13

Changes in Land Use and Livestock, 1962 to 1972

Of those respondents indicating changes in land use for various purposes between 1962 and 1972 the largest number reported expanded hay acreages (Table 13). Pastureland increases were second in importance. Over 75 per cent of those who reported hay land and pasture changes increased the amount of land used for such purposes. A high percentage also reported increases in brush and timber as well as increases for such uses as farm ponds, cover for wildlife, Christmas trees, and mobile home parks. The number of landowners reporting these latter changes, however, was small.

More landowners reported decreases than increases for most crops except corn, small grains, and forage crops. A relatively large amount of land has been removed from agricultural production in the Monongahela River Basin in recent years—land in farms declined by 360,000 acres, 27 per cent, between 1959 and 1969. Since only those still in production responded to the question on land use changes, the results are not reflective of total changes but are merely those applicable to currently active farm operations. The results of this indicate that many current (1972) farm operations have expanded hay and pastureland uses, although the total land devoted to those crops in the basin has been declining. Most operations still in business, however, appear to have expanded (for actual acreages reported in 1972, see Table 18).

The only class of livestock for which more owners reported increases than reported decreases was beef cattle (Table 14). Nearly twice as many reported increases. Other data sources, such as the Census of Agriculture, indicate that beef numbers have been about constant in the basin. Thus, expanded output by both old and new producers has about offset declines from decreased numbers on some farms plus the reduction due to a large decline in the numbers of farms

and land in farms. All other livestock have been decreasing in numbers and more farmers reported decreases than increases. About 30 to 40 per cent of the farmers responding, however, had increased the size of their enterprises. This tends to indicate a trend toward fewer but larger operations.

Landowners also were asked to indicate the largest change they had made in their operations and 479 responded (Table 15). Capital improvements were reported by far the largest number of respondents, with over 36 per cent of the owners listing such changes. Much smaller numbers had cleared land, added livestock, changed to grassland farming, used more lime and fertilizer, or improved their pastures. Several other changes were made by a small number of operators.

TABLE 13. Landowners Reporting Changes in Farmland Uses Between 1962 and 1972, Monongahela River Basin

Land Use	Increased Use		Decreased Use	
	No.	%	No.	%
Corn for grain and silage	210	77.21	62	22.79
Truck crops or fruit trees	78	37.86	128	62.14
Oats, wheat, barley or rye for grain	123	76.40	38	23.60
Small grain for hay or silate	77	67.54	37	32.46
Soybeans	32	32.32	67	67.67
All other hay	33	33.67	65	66.33
Cropland pastured	30	36.58	52	63.42
Brush and timber not pastured	63	86.30	10	13.70
Idle cropland	39	76.47	12	23.53
Other idle land	36	78.26	10	21.74
Soil bank land	33	75.00	11	25.00
Christmas trees, ornamental evergreens, nursery products, flowers, etc.	14	34.15	27	65.85
Acres planted for wildlife	9	25.00	27	75.00
Farm ponds, streams, rivers, etc.	2	5.71	33	94.29
Mobile home parks, housing units, or commercial development	12	41.38	17	58.62
Acres stripped for coal	19	67.86	9	32.14
Acres timbered	9	36.00	16	64.00
Total farm acreage	8	80.00	2	20.00

TABLE 14. Landowners Making Changes in Livestock on Surveyed Farms in the Monongahela River Basin, 1962-1972

Livestock	Increased		Decreased	
	Number	Per Cent	Number	Per Cent
Beef cattle and calves	281	65.65	147	34.35
Dairy cattle and calves	46	38.66	73	61.34
Hogs and pigs	34	34.00	66	66.00
Sheep and lambs	47	47.47	52	52.53
Horses and mules	46	44.66	55	55.34
Goats	12	38.71	18	61.29
Turkeys and chickens	62	44.93	76	55.07

Anticipated Land Use Changes

The landowners were asked to indicate the expected direction of changes in land use and livestock numbers over the next decade, the anticipated acreages and numbers in 1982, and their future plans in general. Future expectations were reported by 645 respondents and these are summarized in Table 16. Nearly half anticipated continuing their current operation without major changes while about 30 per cent planned to expand their acreages and/or farm operations. Some 12 per cent planned to decrease their size of operation while another six per cent intended to sell out completely.

The number of farm operators expecting to increase and decrease acreages of the various land uses are listed in Table 17. Somewhat fewer landowners responded to this question than had indicated actual acreages for 1972, but since many stated that they planned to continue their 1972 level of operation, fewer responses would be expected. Except for soybeans, brush, and timber, idle land, soil bank land, and strip mined land, more farmers expected to increase than decrease all the various use categories. More farmers expected to increase hay, pasture, and corn acreages than for any of the other uses.

Even fewer landowners indicated the actual acreage that they plan to have in the various uses in 1982, but those who did respond indicated that they would have more land in most of the productive uses and somewhat smaller acreages in the less productive uses (Table 18). Thus, the average acreage per farm for corn, small grains, hay and pasture is expected to increase, but idle land, soil bank land, and acres planted for wildlife is expected to decrease on the typical farm. Acres in timber, coal stripping, and mobile homes also are expected to increase on those farms indicating changes in these uses. Despite the increased acreages per farm, the conclusion cannot be reached that total land used for

TABLE 15. Biggest Changes in Land Use, Buildings or Operations in the Monongahela River Basin, 1962-1972

Changes	Number of Respondents	Percentage
Capital improvements (home buildings, machinery and equipment, etc.)	174	36.33
Cleared land of brush and timber	59	12.32
More livestock	35	7.31
Let land revert to brush and timber	24	5.01
Changed from crops to grassland farming	23	4.80
More lime and fertilizer	21	4.34
Water projects	19	3.96
Improved pasture	18	3.76
General land improvement (*e.g.* weed control)	16	3.34
Reduction in farming or crop production	15	3.13
No change	14	2.92
More cropland	12	2.50
Better upkeep of fences	11	2.30
Christmas trees planted and/or sold	10	2.09
Less livestock	5	1.04
Planted fruit trees	5	1.04
Crop rotation, sod seeding, contour planting	5	1.04
Rented land	3	0.63
Others	10	2.09
Total	479	100.00

specific crops will increase in the basin since the number of farms may continue to decline and some land may be converted to nonfarm uses.

Beef cattle was the only class of livestock for which a large number of the landowners planned increases (Table 19).[6] Over three-fourths, 265 out of 338, indicated that they expect to expand beef cattle numbers. A majority also planned to increase all the other livestock classes about which they were asked, but fewer than 100 landowners responded for each class. The average number of

[6]The survey was conducted in 1972 prior to the very favorable beef cattle prices of 1973 and thus the results should not have been distorted due to an unusual price situation.

TABLE 16. Future Plans of Respondent Landowners in the Monongahela River Basin

Future Plans	Number of Respondents	Percentage
Continue farm production as is	316	48.99
Decrease farm production	80	12.40
Expand farm production	173	26.82
Sell the farm	40	6.20
Just buy more land for any reason	32	4.96
Rent more land for any reason	4	0.62
Total	645	100.00

TABLE 17. Anticipated Land Use Changes on Survey Farms in the Monongahela River Basin, 1982

Land Uses	Increase Indicated		Decrease Indicated	
	No.	Per Cent	No.	Per Cent
Corn for grain and silage	96	59.63	65	40.37
Truck crops or fruit trees	66	65.35	35	34.65
Oat, wheat, barley, or rye for grain	39	54.17	33	45.83
Small grain for hay or silage	35	52.24	32	47.76
Soybeans	6	16.67	30	83.33
All other hay	140	77.35	41	22.65
Cropland pastured	96	75.59	31	24.41
Brush and timber not pastured	41	40.59	60	59.41
Idle cropland	12	30.00	28	70.00
Other idle land	8	25.81	23	74.19
Soil bank land	3	12.50	21	87.50
Christmas trees, ornamental evergreens, nursery products, flowers, etc.	32	72.73	12	27.27
Acres planted for wildlife	52	81.25	12	18.75
Farm ponds, streams, rivers, etc.	75	88.24	10	11.76
Mobile home parks, housing units or commercial development	21	61.76	13	38.24
Acres stripped for coal	5	22.73	17	77.27
Acres timbered	32	64.00	18	36.00

TABLE 18. Current and Projected Land Uses for All Respondents in the Monongahela River Basin

Land Use	1972 Number of Respondents	1972 Total Acres	1972 Average Acres	1982 Number of Respondents	1982 Total Acres	1982 Average Acres
Corn for grain and silage	128	2,045	15.98	86	1,850	21.60
Truck crop or fruit trees	76	347	4.58	58	300	5.17
Oats, wheat, barley or rye for grain	50	666	13.32	35	697	19.91
Small grain for hay or silage	32	553	17.28	26	430	16.54
Soybeans	7	181	25.86	5	22	4.40
All other hay	368	12,619	34.29	142	5,810	40.91
Cropland pastured	239	18,275	71.47	102	7,472	73.25
Brush and timber not pastured	221	26,889	121.67	89	17,433	195.88
Idle cropland	46	1,042	22.65	18	523	29.05
Other idle land	42	1,035	24.64	16	218	13.69
Soil bank land	33	126	3.82	9	33	3.67
Christmas trees, ornamental evergreens, nursery products, flowers	48	464	9.67	22	210	9.55
Acres planted for wildlife	48	670	13.96	38	325	8.55
Farm ponds, streams, rivers, etc.	99	380	3.84	54	229	4.24
Mobile home parks, housing units or commercial development	20	112	5.60	19	533	28.05
Acres stripped for coal	25	544	21.76	8	535	66.63
Acres timbered	112	6,316	56.39	44	3,077	69.93
Total farm acreage	—	72,264	—	—	39,705	—

animals per respondent farm will increase between 1972 and 1982 if the expectations are realized. The most dramatic increase, reported by 59 farmers, will be for sheep and lambs which are expected to increase from an average of a little over eight to nearly 62 per farm. Beef cattle numbers per farm would increase from about 32 to 45 according to the reported expectations. It should again be noted that the number of owners indicating expected livestock numbers was fewer than those indicating expected changes and actual numbers on farms in 1972. Since it cannot be known what the non-respondents will do, definite conclusions about numbers per farm and total numbers cannot be made. It does, however, appear that cattle numbers will increase on at least a per farm basis and possibly for the basin since a relatively large number of owners indicated plans to expand. They also indicated that substantially larger numbers of cattle would be on their farms in 1982. The other classes may increase in number per farm but decrease in overall numbers due to fewer farms with such livestock. A possible exception is for sheep and lambs where total numbers may increase if the average number per farm increase is as indicated. This does not seem likely, however, in view of the very long history of declining sheep production in the basin, state, and nation.

LAND USE PROBLEMS

The objective of the analysis for this section was to identify the major problems confronting the rural landowners in the basin. The major procedure for achieving it was through examination of the responses to direct questions about problems.

Farm Operators' Problems

Rural landowners were asked to indicate the three most important problems with which they were confronted (Table 20). The three problems reported by more of the farm operators in Monongahela River Basin were, in order of importance: not enough good farmland to expand operations; not enough money; and not enough labor available for the pay offered.

A total of 222 farm operators indicated that there is not enough good farmland to expand farm operations. In other words, if a successful farm operator intends to expand his business the general hilly topography of the basin or close holding of land would make the action difficult.

The second major problem, selected by 195 farm operators, is a lack of money for farm operations. Although it could be argued that these farmers are not alone in their demand for money, it must be realized that farm operators in the basin and in Appalachia in general are confronted by certain unique problems which aggravate their money problems. For example, a farm operator with plenty of available, good farmland has a greater probable chance of securing a loan for farm expansion than the operators in the basin where there are only widely scattered parcels of good farmland.

TABLE 19. Expected Changes in Livestock Numbers on Survey Farms Between 1972 and 1982, Monongahela River Basin

Type of Livestock	Landowners Reporting Expected Increases	Landowners Reporting Expected Decreases	Number of Landowners Responding and Numbers of Livestock on Farms				Average Number Per Farm	
			1972		1982			
			Farms	Animals	Farms	Animals	1972	1982
Beef cattle and calves	265	73	410	13,163	246	11,119	31.71	45.20
Dairy cattle and calves	30	26	103	2,321	43	1,357	22.54	31.55
Hogs and pigs	43	15	71	691	42	839	9.34	19.52
Sheep and lambs	44	15	69	585	44	2,710	8.49	61.58
Horses and mules	22	20	103	289	33	138	2.81	4.17
Goats	16	9	16	110	12	134	6.87	11.17
Turkeys and chickens	59	22	119	6,679	53	6,544	56.13	123.48

TABLE 20. Farm Operation Problems Cited by Respondent Landowners in the Monongahela River Basin

Problems	Frequency
1 Not enough good farmland to expand operations	222
2 Not enough money	195
3 Labor not available for pay offered	171
4 Labor not available at ANY pay offered	164
5 Not enough fences and fenced pasture	158
6 Land too steep for machinery	157
7 Available land too expensive	133
8 Poor prices for farm products	133
9 "Other" problems	118
10 Not enough financial help (with taxes for example)	69
11 Poor soils	65
12 Not enough technical production help, such as soil testing, rotation and breeding advice, fertilizer recommendations, etc.	63
13 Not enough markets	56
14 Flood damages	30
15 Bad water supplies	27
Total	1,761

Third, many farm operators found it very difficult to obtain labor, as indicated by 171 respondents. Competing uses, the low pay rates, and undesirability of farm work contribute to the lack of labor. Other important problems in descending order of frequency cited included: labor not available at any rate; not enough fences and fenced pasture; land too steep for machinery; available land too expensive; and poor prices for farm products.

Although all the landowners were asked to identify the three major problems confronting them, 313 respondents did not indicate a problem. It could be assumed that these landowners did not perceive major problems

confronting them. Sixty respondents identified only one problem each while 88 others identified two problems each. However, 296 respondents identified the requested three problems. A few landowners also went so far as to identify as problems all the 13 possibilities listed in the questionnaire.

Water Sources and Problems

A very important factor in agricultural and other development is an adequate water supply, *i.e.*, water in sufficient quantities and of satisfactory quality for farm and home uses. Surveyed rural landowners indicated that they depended on a wide range of water sources for their rural domestic water needs. Most common were deep wells and springs which accounted for 71 per cent of all water sources. Other sources by order of importance included city water, ponds, creeks, cisterns, and rivers. Proportionate data by the types of rural domestic water sources are included in Table 21. At present, problems associated with these rural water supplies appear to be minimal. A high proportion (92 per cent) indicated that they were satisfied with current water supplies for household uses. Data in Table 22 are the locations (to the nearest town) for those who are dissatisfied with their rural domestic water supplies. Note that some towns were listed together if the concentric mileage circles to the nearest town overlapped. The linkages of towns show that the rural domestic water problem areas were concentrated in the counties of Harrison, Barbour, and Marion. These are also areas of intense mining activity where water tables are disturbed and lowered by sub-surface fractures that render deep wells unreliable. In addition, low water quality of surface streams in these areas restricts the alternatives for surface withdrawals and impoundments.

With respect to water for farm uses, the proportion of the sampled rural landowners that indicated satisfaction was also very high (93 per cent). This is nearly identical to the proportion satisfied with water for household uses. However, only 19 of those dissatisfied with water for either use were the same responding landowners, even though the problem areas were similar (Table 23). Also, note the relatively high frequency of water problems reported by residents in Barbour and Harrison counties. An additional perspective rests with the fact that only 27 of the 892 sampled listed bad water supplies as one of the three most important problems of farm operations that ranked last among the 15 categories (Table 20).

Approximately 32 per cent of the sampled rural landowners indicated that they had some type of water management problems and that either flood protection (80 per cent) or wetland drainage (20 per cent) would improve farm operations. Irrigation was not specifically mentioned as a problem of constraint to farm operations. The additional perspective to water management problems is gained by the fact that 30 respondents considered flood damages as one of the three most important problems to farm operations (Table 20); however, this category ranked next to last in this list of 15.

TABLE 21. Sources of Rural Domestic Water Supplies for Survey Farms in the Monongahela River Basin

Sources	Proportion of Sample
City water	11.88
Deep wells	49.24
Springs	22.41
Cisterns	3.91
Creeks	5.77
Rivers	0.34
Ponds	6.45
Total	100.00

Another land-related water problem in the basin was acid mine drainage. Nine per cent of those sampled indicated that acid mine drainage was serious on their own lands. However, one-fourth of the 892 respondents indicated that acid mine drainage was a serious pollutant in their area. This difference in estimation of the same problem rests with the composition of the sample. It is probable that land used for coal production passed from the ownership of persons who formerly used the land for less intensive purposes. Therefore, new owners of mineral and surface rights would be less likely to be included in the sample population composed of persons with agricultural and/or forest lands. It also follows that the incidence of acid mine drainage on lands in the sample would be less frequent.

Disturbed Lands

Farm operators were asked to indicate the total acreage of their entire lands which were "disturbed, eroded, barren, or wasteland needing fertilization, seedlings, grading, and revegetation." Responses showed that 8,934 acres owned by 245 respondents were in need of land treatment. Forty-five respondents indicated that 1,214 acres (or 13 per cent) of the above acreage was "old bare strip mine lands."

SUMMARY AND CONCLUSION

The major source of information for this study was 892 returned questionnaires out of 4,125 mailed to rural landowners in the 10 counties of the Monongahela River Basin. The names had been randomly selected out of 11,528.

About 70 per cent of the respondents had annual farm sales of less than $2,500, which indicated that off-farm sources of income are very important.

Capital improvements were reported as the greatest change in the land use, and the lack of good farmland to expand farm operations was regarded as the greatest problem confronting farm operators. One major conflict that seemed apparent in the study was that while many farm operators expressed a desire to

TABLE 22. Locations of Respondent Landowners Dissatisfied with Rural Domestic Water Supplies in the Monongahela River Basin.

Nearest Town	County	Number Dissatisfied	Mileage to Nearest Town
Philippi, Belington	Barbour	8	3-20
Clarksburg, Bridgeport	Harrison	7	.25-13
Clarksburg, Salem,		5	2-15
Lost Creek, McWhorter,		2	.10-2
Shinnston, Lumberport, Dola, Brown, Wallace		7	.25-15
Weston	Lewis	3	8-15
Fairmont, Rivesville, Farmington,	Marion	5	1-9
Mannington, Boothsville		1	4
Morgantown, Osage	Monongalia	2	2-10
Kingwood, Howesville,	Preston	3	2-5
Tunnelton, Reedsville,		2	1-6
Gladesville, Rowlesburg		1	8
Huttonsville, Dry Fork, Glady	Randolph	1	3
Grafton	Taylor	2	7-9
Eglon, Woolen Mill	Tucker	1	2
Buckhannon, French Creek,	Upshur	3	2-13
Ireland		1	5

do specific things, the data indicated that some contrary actions had been occurring and probably would continue. Beef cattle and calves have been, and will continue to be, the dominant livestock enterprise.

Land use changes apparently will continue to follow the past trends of decreasing total farms and farmland acreages, accompanied by increases in

TABLE 23. Locations of Respondent Landowners Dissatisfied with Farm Water Supplies in the Monongahela River Basin.

Nearest Town	County	Number Dissatisfied	Mileage to Nearest Town
Philippi, Volga	Barbour	5	2-20
Clarksburg, Bridgeport,	Harrison	8	3-9
Clarksburg, Salem, Bristol,		10	3-15
Lost Creek, McWhorter,		2	10-3
Shinnston, Lumberport, Brown		5	2-15
Roanoke–Weston, Jane Lew	Lewis	5	1-20
Fairmont, Boothsville	Marion	1	9
		1	2
Morgantown	Monongalia	1	9
Brandonville, Valley Point,	Preston	4	2-5
Gladesville,		1	1
Kingwood, Newburg		3	2-5
Elkins, Beverly	Randolph	2	2
		1	1
Dry Fork, Huttonsville		1	3
Grafton	Taylor	2	6-7
Montrose	Tucker	3	4
Buckhannon	Upshur	3	3-10
Mount Morris	Green Co., PA	1	2

forest, recreational, and commercial land use, while the remaining farms will continue to increase in size. Some of the anticipated changes in livestock production, however, may cause more land to be used for hay and pasture. Beef cattle and calves apparently will continue to dominate livestock production, since a majority of the current cattle producers expressed an intention to expand beef cattle numbers. Any significant increase in cattle numbers would require larger hay and pasture acreages.

The study indicated that there will be a continued change in land use in the coming decade. However, about three-quarters of the sampled landowners who responded to questions about agricultural uses plan to either continue as at present or to expand their operations. To some extent, the age of a farm operator seemed to be the dominate factor influencing changes that might be made in land use. Most landowners are 40 years old or older and these indicate less willingness to change than do younger respondents. The major obstacles to expanded farm production are a lack of availability of good land, money, and labor. Of those who do plan to make changes, most want to aquire more land and/or expand their livestock oprations. It also appears that nonfarm uses such as mobile home parks and recreational projects will continue to increase, although they will continue to be relatively small uses from the standpoint of total acreages involved.

Appendix A

Distribution of Crop Acres on Survey Farms in the Monongahela River Basin, 1972

Corn for Grain and Silage, 1972

Acres	Number of Respondents	Percentage
0- 5	62	48.44
6- 10	30	23.44
11- 20	11	8.59
21- 40	13	1.15
41-100	12	9.37
Total	128	100.00

Truck Crops or Fruit Trees, 1972

Acres	Number of Respondents	Percentage
1	41	43.94
2	14	18.42
3	9	11.84
4	2	2.63
5	3	3.94
7	1	1.32
11	3	3.95
12	1	1.32
50	1	1.32
	1	1.32
Total	76	100.00

Oat, Wheat, Barley or Rye for Grain, 1972

Acres	Number of Respondents	Percentage
0- 5	21	42.00
6- 10	14	28.00
11- 20	9	18.00
21-100	6	12.00
Total	50	100.00

Small Grains for Hay or Silage, 1972

Acres	Number of Respondents	Percentage
1- 5	17	53.13
6- 10	5	15.62
11-100	10	31.25
Total	32	100.00

Soybeans,1972

Acres	Number of Respondents	Percentage
1	2	28.5
2	1	14.3
5	1	14.3
18	1	14.3
55	1	14.3
	1	14.3
Total	7	100.0

All Other Hay, 1972

Acres	Number of Respondents	Percentage
1-10	96	26.08
11-20	94	25.54
21-30	62	16.82
31-40	31	8.41
41-50	23	6.25
Above 50	28	7.60
Total	368	100.00

Brush and Timber Not Pastured, 1972

Acres	Number of Respondents	Percentage
1- 10	43	19.46
11- 20	37	16.75
21- 30	18	8.14
31- 40	13	5.88
41- 50	9	4.07
51-100	45	20.36
Above 100	56	25.34
Total	221	100.00

Cropland Pastured, 1972

Acres	Number of Respondents	Percentage
0- 10	50	23.92
11- 20	41	17.15
21- 30	22	9.20
31- 40	20	8.37
41- 50	15	6.27
51-100	43	17.99
Above 100	48	20.08
Total	239	100.00

Idle Cropland, 1972

Acres	Number of Respondents	Percentage
1- 5	13	28.27
6- 10	8	17.39
11- 20	11	23.91
21-100	11	23.91
Over 100	3	6.52
Total	46	100.00

Other Idle Land, 1972

Acres	Number of Respondents	Percentage
1- 5	13	30.95
6- 10	7	21.87
11- 20	4	9.52
21- 30	8	25.00
31- 50	5	15.63
51-100	3	9.38
Above 100	2	6.25
Total	42	100.00

Soil Bank Land, 1972

Acres	Number of Respondents	Percentage
1	7	21.21
2	7	21.21
3	7	21.21
4	3	9.09
5	4	12.13
6	1	3.03
10	1	3.03
11	2	6.06
14	1	3.03
Total	33	100.00

Christmas Trees, Ornamental Evergreens, Nursery Products, Flowers, Etc., 1972

Acres	Number of Respondents	Percentage
1- 5	33	67.75
6- 10	5	10.42
11- 20	4	8.33
21-100	5	10.42
Above 100	1	2.08
Total	48	100.00

Acres Planted for Wildlife, 1972

Acres	Number of Respondents	Percentage
1	11	22.92
2	5	10.42
3	6	12.50
4	3	6.25
5	7	14.58
7	2	4.17
10	7	14.58
20	2	4.17
25	2	4.17
30	2	4.17
—	1	2.08
Total	48	100.00

Acres Stripped for Coal

Acres	Number of Respondents	Percentage
1	2	8.0
6	1	4.0
7	2	8.0
8	2	8.0
10	2	8.0
15	3	12.0
16	1	4.0
20	2	8.0
25	1	4.0
30	2	8.0
35	2	8.0
40	2	8.0
50	3	12.0
Total	25	100.0

Acres Timbered

Acres	Number of Respondents	Percentage
1- 10	33	29.7
11- 20	19	17.1
21- 30	11	10.0
31- 40	7	6.3
41- 50	7	6.3
51-100	21	18.9
101-200	9	8.1
201-700	4	3.6
Total	111	100.0

Total Farm Acreage

Acres	Number of Respondents	Percentage
0-50	75	24.83
51-100	71	23.51
101-200	78	25.83
201-300	37	12.51
301-400	14	4.63
401-500	6	1.98
501-750	10	3.31
751-1,000	2	0.66
1,001-5,000	8	2.65
Over 5,000	1	0.33
Total	302	100.00

Appendix B

Distribution of Livestock Numbers on Survey Farms in the Monongahela River Basin, 1972

Beef Cattle and Calves on Survey Farms in 1972

Numbers on Farm	Frequency	Percentage
0- 10	148	35.66
11- 20	94	22.65
21- 30	54	13.01
31- 40	37	8.92
41- 50	25	6.03
51-100	40	9.64
101-200	13	3.13
Above 200	4	0.96
Totals	415	100.00

Dairy Cattle and Calves on Survey Farms in 1972

Number on Farm	Frequency	Percentage
0- 10	74	71.85
11- 20	5	4.85
21- 30	2	1.94
31- 40	3	2.91
41- 50	3	2.91
51-100	9	8.74
101-200	6	5.83
Above 200	1	0.97
Totals	103	100.00

Hogs and Pigs on Survey Farms in 1972

Number on Farm	Frequency	Percentage
0- 5	57	77.03
6- 10	7	9.46
11- 20	7	9.46
21-100	0	0.00
Over 100	3	4.05
Totals	74	100.00

Sheep and Lambs on Survey Farms in 1972

Number on Farm	Frequency	Percentage
0- 5	44	63.77
6- 10	13	18.84
11- 20	7	10.14
21-100	4	5.80
Over 100	1	1.45
Totals	69	100.00

Horses and Mules on Survey Farms in 1972

Number on Farm	Frequency	Percentage
1	34	32.69
2	31	29.81
3	13	12.50
4	9	8.66
5	7	6.73
6	1	0.96
7	1	0.96
8	2	1.92
9	3	2.89
10	1	0.96
11	1	0.96
15	1	0.96
Totals	104	100.00

Goats on Survey Farms in 1972

Number on Farm	Frequency	Percentage
1	3	18.75
2	4	25.00
3	2	12.50
4	1	6.25
5	1	6.25
6	2	12.50
9	1	6.25
13	1	6.25
50	1	6.25
Totals	16	100.00

Turkeys and Chickens on Survey Farms in 1972

Number on Farm	Frequency	Percentage
0- 10	20	16.53
11- 20	24	19.84
21- 30	21	17.35
31- 40	9	7.43
41- 50	14	11.57
51-100	21	17.36
Above 100	12	9.92
Totals	121	100.00

Rabbits on Survey Farms in 1972

Number on Farm	Frequency	Percentage
6	1	20
8	1	20
20	1	20
30	1	20
100	1	20
Totals	5	100